

82. A method of determining the optical characteristics of a dental object with an apparatus that includes an imaging element, the method comprising the steps of:

generating an image of the dental object with the imaging element;

software processing the image of the dental object; and

generating optical characteristics data indicative of the optical characteristics of the dental object;

wherein under software control a determination is made of a plurality of regions of the dental object that have different optical characteristics;

wherein optical characteristics data are generated in one or more of the plurality of regions.

83. The method of claim 82, wherein the method further comprises the step of generating optical characteristics data of a reference standard, wherein the optical characteristics data are generated based on optical characteristics data of the reference standard.

84. The method of claim 82, wherein a spectrometer measures light returned from the dental object in a plurality of spectral bands.

85. The method of claim 82, wherein audio feedback is generated, wherein the audio feedback guides a user's operation of the apparatus.

86. The method of claim 82, wherein the optical characteristics data are stored in a database, wherein the optical characteristics data are generated a plurality of times for a plurality of dental objects to generate a plurality of optical characteristics database records.

87. The method of claim 86, wherein the database records are associated with particular patients.

88. The method of claim 86, wherein the database records store images representative of the dental objects.

89. The method of claim 88, wherein the images representative of the dental objects comprise images of the dental objects captured with the imaging element.

90. The method of claim 86, wherein the optical characteristics data are generated a plurality of times for the dental object, wherein a database stores a historical record of the optical characteristics of the dental object.

91. The method of claim 82, wherein a second dental object is produced based on the optical characteristics data.

92. The method of claim 91, wherein optical characteristics of the second dental object are determined prior to installation of the second dental object in a patient's mouth.

93. The method of claim 92, wherein the optical characteristics of the second dental object are determined with the apparatus or a second apparatus.

94. The method of claim 92, wherein the optical characteristics of the second dental object are determined at a location where the second dental object is produced.

95. The method of claim 94, wherein the optical characteristics of the second dental object are determined with a second apparatus.

96. The method of claim 92, wherein the optical characteristics of the second dental object are determined at a location wherein the second dental object is to be installed in the patient's mouth.

97. The method of claim 96, wherein the optical characteristics of the second dental object are determined with the apparatus.

98. The method of claim 91, wherein the second dental object comprises a denture.

99. The method of claim 91, wherein the second dental object comprises a dental prosthesis.

100. The method of claim 91, wherein the second dental object comprises a filling.

101. The method of claim 91, wherein the second dental object comprises a tooth-colored filling.

102. The method of claim 91, wherein the second dental object comprises a composite filling.

103. The method of claim 91, wherein the second dental object is produced based on a porcelain recipe determined in accordance with the optical characteristics data.

104. The method of claim 82, wherein the optical characteristics data are electronically transmitted to a remote location, wherein a second object is produced at the remote location based on the transmitted optical characteristics data.

105. The method of claim 104, wherein the electronic transmission comprises a modem transmission.

106. The method of claim 104, wherein the electronic transmission includes a transmission of an image representative of the dental object.

107. The method of claim 106, wherein the image representative of the dental object comprises an image of the dental object captured with the imaging element.

108. The method of claim 82, wherein the optical characteristics data are stored in a database, wherein the database includes date and time information associated with the optical characteristics data.

109. The method of claim 82, wherein the optical characteristics data are stored in a database, wherein optical characteristics data indicative of the optical characteristics are generated a plurality of times, including at least once for a plurality of the regions.

110. The method of claim 109, wherein the database stores sectoring information with the optical characteristics data.

111. The method of claim 110, wherein the database stores information corresponding to a pictorial representation of the dental object that includes sector grid lines.

112. The method of claim 82, wherein a material mixing unit receives the optical characteristics data, wherein the material mixing unit prepares constituent materials for a second dental object based on the optical characteristics data.

113. The method of claim 82, wherein the imaging element comprises an intraoral camera.

114. The method of claim 82, wherein the imaging element comprises a video camera.

115. The method of claim 82, wherein the optical characteristics data is output in the form of a closest match or matches to one or a plurality of sets of stored shade guide values.

116. The method of claim 82, wherein a computing system stores data corresponding to a plurality of shade guide systems, each of the plurality of shade guide systems having a plurality of shade guide values, wherein the optical characteristics data is output in the form of a closest match or matches to one or more of the shade guide values in the plurality of shade guide systems.

117. The method of claim 116, wherein the optical characteristics data is output in the form of the closest match to one of the shade guide values in the plurality of shade guide systems.

118. The method of claim 82, wherein the optical characteristics data is used to electronically output a proposed recipe of materials for preparing a second dental object.

119. The method of claim 118, wherein the optical characteristics data is used to electronically output a proposed recipe of materials and instruction information for preparing a second dental object.

120. The method of claim 82, wherein the optical characteristics data is output in the form of one or more sets of color tri-stimulus values.

121. The method of claim 82, wherein an image of the dental object is displayed, wherein data indicative of the color of the dental object in one or more particular regions of the plurality of regions are displayed in an overlaid manner over the one or more particular regions.

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